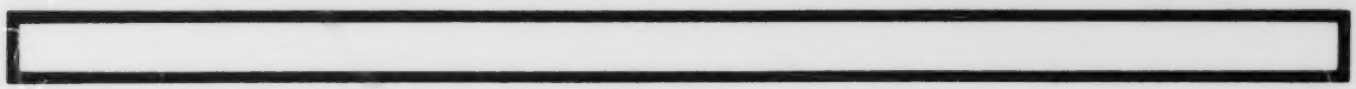
PB88-126537

Superfund Record of Decision (EPA Region 3) Palmerton Zinc Site, Palmerton, Pennsylvania (Interim Remedial Measure), September 1987

(U.S.) Environmental Protection Agency
Washington, DC

4 Sep 87



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TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
1. REPORT NO. EPA/ROD/R03-87/036	2.	3. RECIPIENT'S ACCESSION NO. PB88126537/AS
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION Palmerton Zinc, PA Interim Remedial Measure		5. REPORT DATE September 4, 1987
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT NO
		11. CONTRACT/GRANT NO
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report
		14. SPONSORING AGENCY CODE 800/00
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

The Palmerton Zinc site is located in Carbon County, Pennsylvania. The New Jersey Zinc Company currently operates two zinc smeltors in Palmerton at the base of Blue Mountain. These two smeltors are referred to as the east and west plants. Since 1898, the New Jersey Zinc facility has produced zinc and other metals for machinery, pharmaceuticals, pigments and many other products. Primary smelting of concentrated zinc sulfide ores which was terminated in December 1980, is the main source of pollution. Prior to December 1980, the smeltors emitted huge quantities of zinc, lead, cadmium and sulfer dioxide which led to the defoliation of approximately 2,000 acres on Blue Mountain, adjacent to the east smeltor. Vegetation damage first appeared on a 1951 aerial photograph as isolated patches on the steep, north-facing slope of Blue Mountain located immediately south of the east plant. By 1985, vegetation damage progressed over a continuous widespread area leaving barren, eroded land visible. The primary contaminants of concern leading to the defoliation of Blue Mountain include: zinc, lead, cadmium and sulfur dioxide.

The selected interim remedial measure focuses on the establishment of a natural eastern forest ecosystem and includes: onsite installation of a concrete pad with berms to mix offsite sewage sludge and fly ash; construction of access roads; application of lime (10 tons per acre) and potash (80 pounds actual potassium per acre) on areas

(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Palmerton Zinc, PA Interim Remecial Measure Contaminated Media: woods, soil, sw Key contaminants: zinc, lead, cadmium, sulfur dioxide, inorganics, heavy metals		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 36
	20. SECURITY CLASS (This page) None	22. PRICE PC12.95 / MF 6.95

EPA/ROD/R03-87/036
Palmerton Zinc, PA
Interim Remedial Action

16. ABSTRACT (continued)

targeted for revegetation; application of fly ash and offsite sludge on target areas; application of grass seed or seedlings onto target areas; and application of mulch to protect the seed. The municipalities that may apply the sewage sludge and other amendments should do so at no cost to EPA, provided the cost of implementing the alternative is less than it costs the municipalities to dispose of the sludge. A minimal capital cost may be developed pending the outcome of municipality implementation issues. O&M will not be required.

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Palmerton Zinc Superfund Site - Blue Mountain Operable Unit
Town of Palmerton, Carbon County, Pennsylvania

STATEMENT OF PURPOSE

This decision document represents the selected remedial action for this site developed in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan.

STATEMENT OF BASIS

This decision is based upon the administrative record (index attached). The attached index identifies the items which comprise the administrative record upon which the selection of a remedial action is based.

DESCRIPTION OF THE SELECTED REMEDY

This is an interim remedy which focuses on the first of three separate operable units at the New Jersey Zinc smelter. The other two operable units are being investigated by the responsible parties and will be addressed at a later date.

The selected site remedy does not attempt to ensure compliance with all ARARS, but will be consistent, to the extent practicable, with those action specific ARARS addressing sludge application, the Clean Water Act and Best Management Practice requirements.

The selected remedy consists of using a mixture of sewage sludge and fly ash to revegetate the defoliated areas of Blue Mountain. The general procedures for the revegetation program would be as follows:

- Step 1: Heavy equipment (i.e., bulldozers) would be used to install access roads in the areas targeted for revegetation.

  A concrete pad with reasonable berms would be installed to mix the sludge and fly ash on-site.

- Step 2: Lime potash application -- Lime and potash would be sprayed on the areas targeted for revegetation. Lime would be applied at approximately 10 tons per acre and potash at 80 pounds actual K per acre.

- Step 3: Sludge-fly ash application -- The sludge-fly ash mixture would be applied by spraying the mixture onto the target area. The sludge-fly ash ratio will be based on further analysis of the field test plots. The sludge will be obtained from the Town of Palmerton, Allentown, and, if necessary, Philadelphia.

- Step 4: Plant target area -- Grasses would be planted by blowing a mixture of grass seed onto the target area. Studies are continuing on the feasibility of also blowing tree seed onto the area. If tree seed will not germinate, seedlings will be planted.

- Step 5: Apply mulch -- To protect the seed and permit germination, adequate mulch will have to be applied. Mulching may be reduced or eliminated if spring oats are planted in the fall. This will provide winter cover that will die by spring. The target areas can then be seeded with the permanent plant species in the spring, and the spring oat stubble will serve as a protective "mulch" cover for the permanent species needed.

DECLARATION

The selected remedy is an interim remedy and is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy satisfies the preference for treatment that reduces mobility or volume as a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

9/4/87
Date

James M. Seif
Regional Administrator

PB88-126537

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R03-87/038
September 1987

EPA

Superfund Record of Decision:

Palmerton Zinc, PA

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Site Description and
Summary of Remedial Alternative Selection
for the Palmerton Zinc Superfund Site
-Blue Mountain Operable Unit-

Introduction

The Superfund investigation of the New Jersey Zinc Company smelter (aka Palmerton Zinc smelter) focuses on three problem areas: first, the deposition of heavy metals, mainly cadmium, lead, and zinc, throughout the valley as a result of air emissions from the smelter; second, the tremendous slag pile, approximately 2.5 miles long which consists of an estimated 33 million tons of slag; and third, the defoliation of Blue Mountain next to the smelter.

The investigation of the defoliation of Blue Mountain next to the smelter is the subject that will be discussed herein. This Record of Decision (ROD) will summarize the results of a Superfund Remedial Investigaton/Feasibility Study (RI/FS) that focused on the defoliated sections of Blue Mountain and will present an interim remedy for remedial action. The other two problem areas are being investigated by the responsible parties.

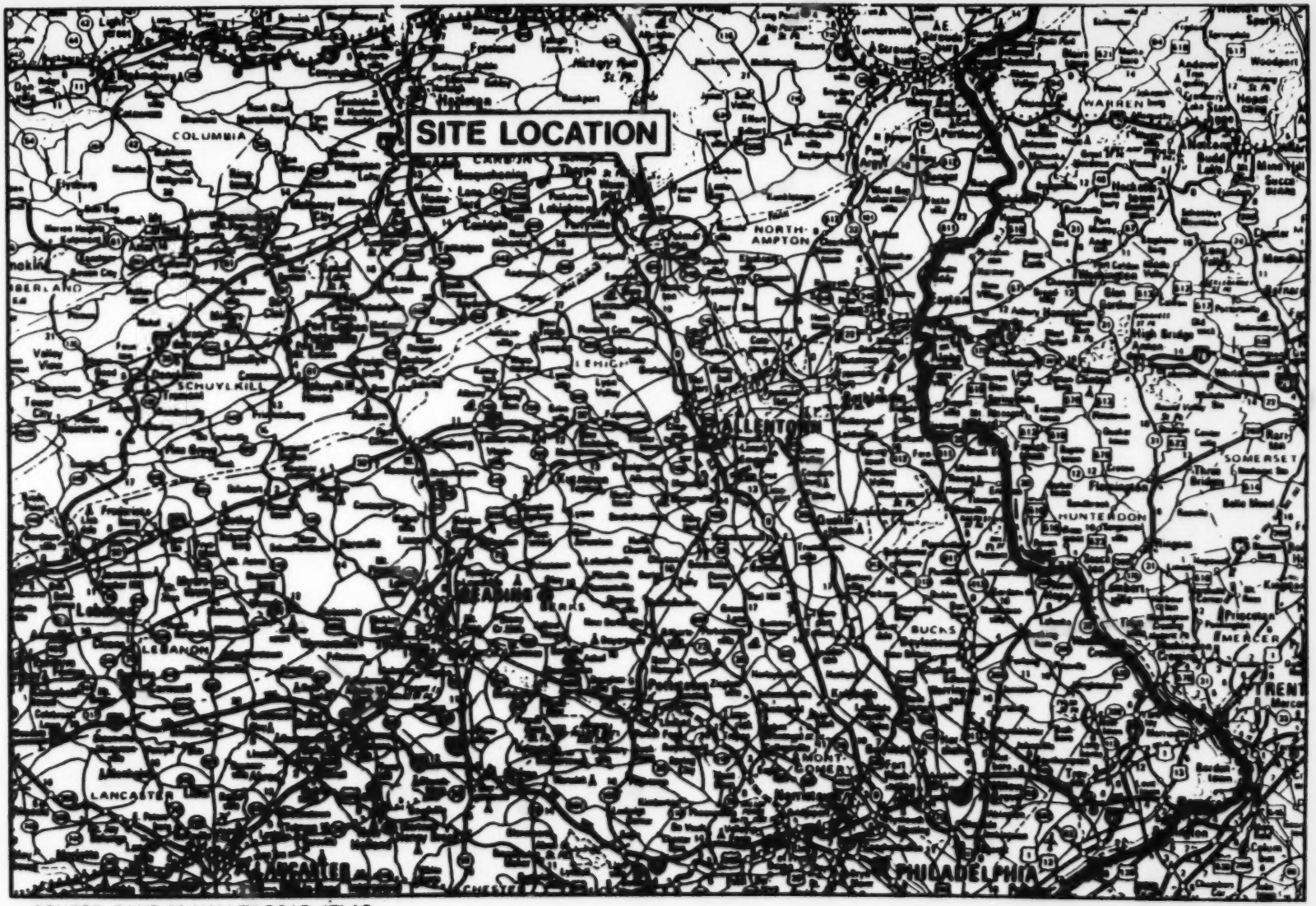
On September 24, 1985, the U.S. Environmental Protection Agency (EPA) entered into a consent order with Horsehead Industries, Inc., the current owner of the zinc smelter, and Gulf & Western Inc., the past owner. Under the consent order, Horsehead Industries is conducting an RI/FS on the slag pile and associated ground water and surface water contamination. Gulf & Western is conducting an RI/FS on the area-wide soil contamination. The findings of these activities will be presented by the end of 1987 or early 1988.

Site Location and Description

The Palmerton Zinc Superfund Site is located in the vicinty of the Town of Palmerton, Carbon County, Pennsylvania as shown on Figure 1. The town is situated at the confluence of the Lehigh River and Aquashicola Creek, just north of the Lehigh Water Gap. Land uses in the area include industrial sites, forest lands, residential communities and agricultural farmlands. Approximately 7,000 residents live within the town which has historically provided a majority of the workforce at the New Jersey Zinc smelter. From 1898 to 1967 the smelter was privately owned. It was sold to Gulf & Western Inc. who operated the facility up until 1981, when it was purchased by its current owner Horsehead Industries, Inc..

Geographically the topography surrounding the site is mountainous. It lies in a deep valley within the Appalachian Mountains between Blue Mountain (elevation 1,500 feet) and Stony Ridge (elevation 900 feet). The Appalachian Trail runs along the top of Blue Mountain.

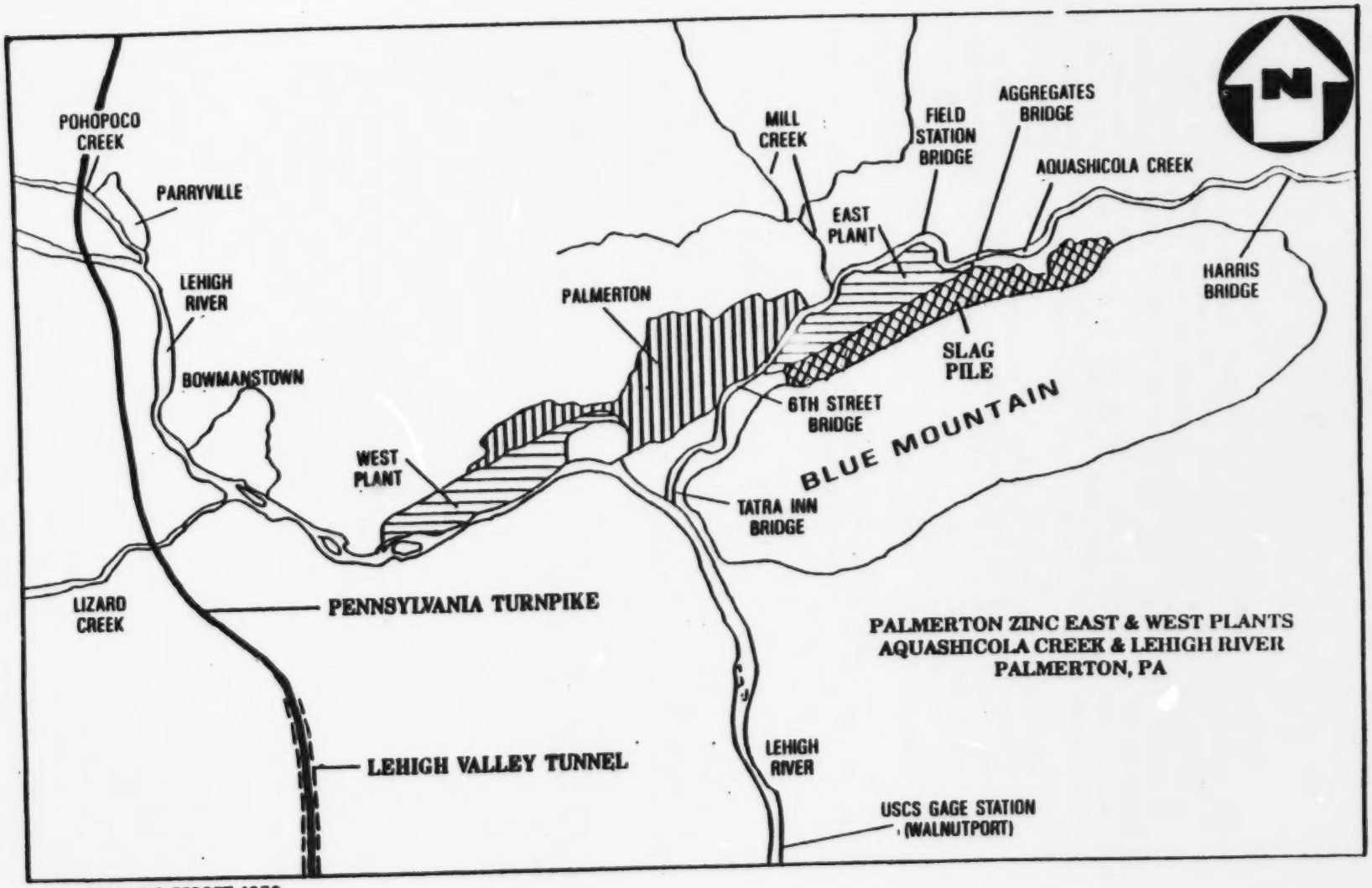
The smelting operations are located at two separate locations, a west smelter and an east smelter. Both smelters are located at the base of Blue Mountain (see Figure 2).



SOURCE: RAND McNALLEY ROAD ATLAS

SITE LOCATION
PALMERTON ZINC SITE, PALMERTON, PA
S 1" - 95040'

Figur



SOURCE: NEIC REPORT 1979

SITE SKETCH
PALMERTON ZINC SITE, PALMERTON, PA
SCALE 1" = 2520'

Figure 2

The major watercourse in the project area is the Lehigh River. The drainage pattern of the study area is toward Aquashicola Creek, a tributary of the Lehigh River. Aquashicola Creek flows through a buried valley, between Blue Mountain on the south and Stony Ridge on the north. The creek flows southwesterly and is joined by Buckwha Creek about one-half mile upstream of Harris Bridge and by Mill Creek near the east plant's main gate. Aquashicola Creek flows into the Lehigh River approximately 1.5 miles southwest of the zinc plant.

The reach of Aquashicola Creek in Palmerton is classified as a trout-stocking stream by the Pennsylvania Department of Environmental Resources. According to the criteria of water uses in this classification, the creek should maintain stocked trout from February 15 to July 31. It should also maintain and propagate fish species and additional flora and fauna that are indigenous to a warm-water habitat.

A water intake is located on the Aquashicola Creek near the Field Stone Bridge. This intake pumps water from the stream for industrial use at the east plant. Aquashicola Creek water is also pumped from an intake located between the Main Gate Bridge and the Sixth Street Bridge during times of emergency need for industrial process water.

Ground water in the site vicinity occurs in both the unconsolidated deposits and the underlying bedrock. The glacial outwash deposits in the stream valley contain significant quantities of available ground water, as is typical of this type of deposit.

At the foot of Blue Mountain, the Palmer Water Company, which supplies water to the towns of Palmerton and Aquashicola, has as its water source four production wells, ranging in depth from about 200 feet to more than 400 feet, drawing ground water from bedrock. The yield of these wells reportedly ranges from 115 to 130 gallons per minute.

Site History

The New Jersey Zinc Company currently operates two zinc smelters in Palmerton, referenced to as the east and west plants, respectively. The west smelter began operations in 1898, and in 1911, the east plant opened for operation. The New Jersey Zinc facility has produced zinc and other metals for machinery, pharmaceuticals, pigments, and many other products.

Primary smelting of concentrated zinc sulfide ores, which is the main source of pollution, was stopped in December of 1980. However, up until then the smelters had emitted huge quantities of zinc, lead, cadmium and sulfur dioxide which has led to the defoliation of approximately 2,000 acres on Blue Mountain which is located adjacent to the east smelter. Aerial photography of the site taken from 1938 to 1965 has shown the various stages of vegetation damage. Vegetation damage is defined as areas of exposed rock and soil where the original vegetation, as seen on a 1938 aerial photograph, has probably been destroyed as a result of the smelter's emissions.

Vegetation damage first appeared on a 1951 aerial photograph as isolated patches on the steep, north-facing slope of Blue Mountain, located immediately south of the Palmerton Zinc smelter's east plant. During the period of analysis, the vegetation damage progressed and additional areas of damage appeared. By 1965, vegetation damage appeared over a continuous widespread area with barren, eroded land visible from aerial photographs.

Current Site Status

Surface soils samples were collected from the defoliated portions of Blue Mountain. Five sample sites from different locations of the mountain were selected and analyzed for the metals of concern. Recorded levels of cadmium ranged from a high of 1,300 ppm to a low of 364 ppm, lead from from 6,475 ppm to 1,200 ppm, and zinc from 35,000 ppm to 13,000 ppm. The maximum levels are up to 2,600 times the typical regional background levels for cadmium, over 2,000 times the regional background levels for lead, and over 400 times the regional background levels for zinc. Depth profiles showed that most of the metal contamination is contained within the top 6 to 10 inches of soil. This is because the metals are bound in organic materials which prevent significant downward movement of metals.

Water flowing across the defoliated portions of Blue Mountain has eroded the surface and become contaminated with metals contained in the soil. The runoff and erosion has carried the metal ladened soil into Aquashicola Creek.

The runoff has been sampled twice in recent years. In May of 1979, EPA sampled the runoff as part of a comprehensive study of the smelter. In March of 1986, Horsehead Industries sampled the runoff under a Superfund consent agreement with EPA. The levels obtained were compared to EPA's ambient water-quality criteria. At almost every sampling location, the criteria was exceeded; in some instances, the levels were 20 times higher than the criteria. The results of the sampling effort performed in 1986 by Horsehead Industries is presented in Table 1.

A 1984 study by the U.S. Fish and Wildlife Service found very high metal concentrations in fish taken from streams in the area. Although the major source of the metal contaminating the creek comes from the smelter property, the runoff from the mountain contributes to the contamination and, in turn, to high metal levels in the fish. Figure 3 is a summary of all fish-sampling results.

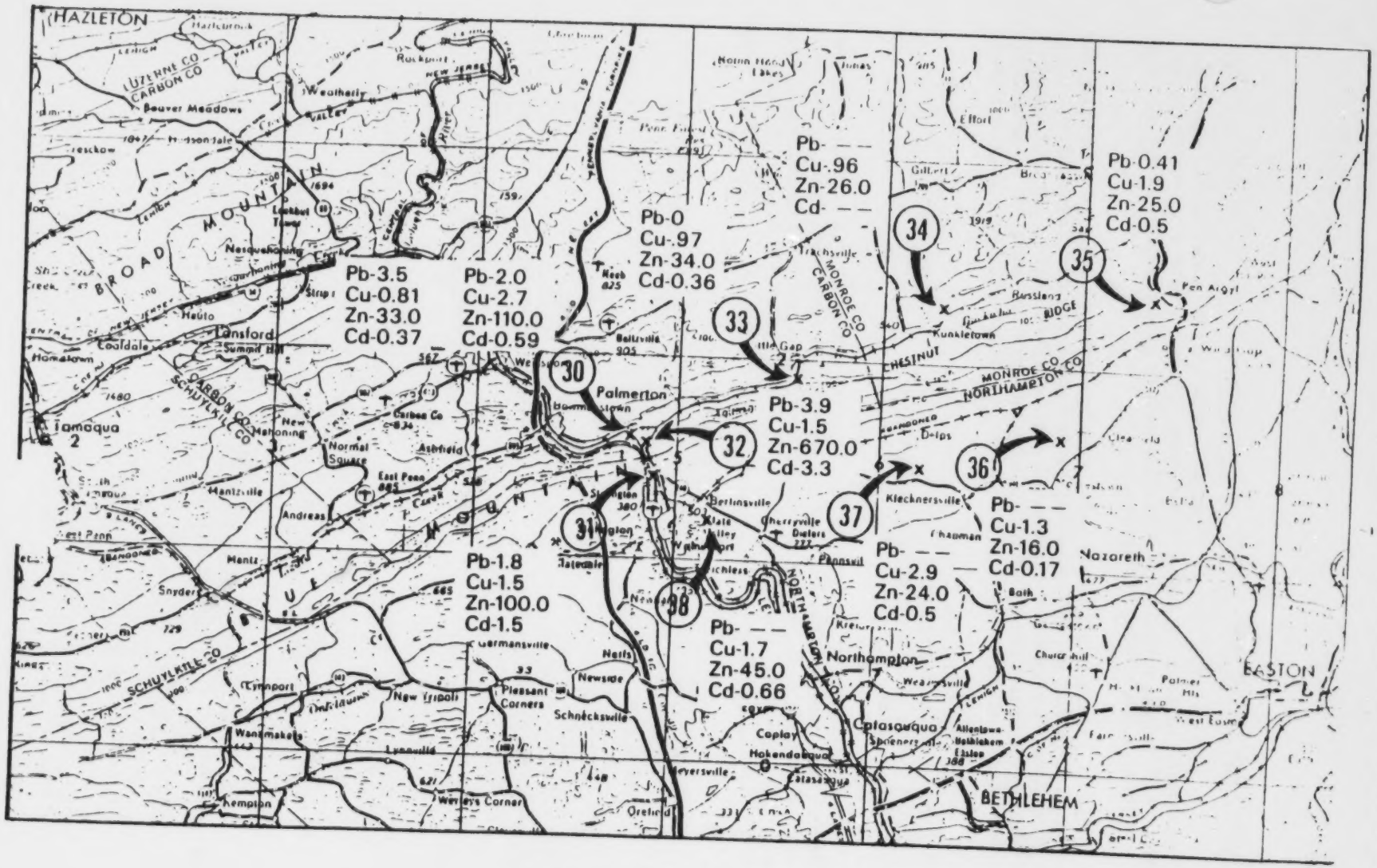
The environmental impacts of the metal contamination on the affected area of Blue Mountain are obvious to the naked eye. Besides the defoliated vegetation and erosion, a noticeable absence of microflora, lichens, arthropods and wildlife species has occurred. Researchers have studied this area extensively and have concluded that due to the impact on such a wide variety of organisms in the ecosystem, a comprehensive picture of the effects of poorly controlled metal emissions emerges.

Table I

Blue Mountain Runoff-1986 Sampling Results

Sample	Cadmium AWQC 1 day = 3.9 4 day = 1.1		Zinc AWQC 1 day = 120 4 day = 110		Lead AWQC 1 day = 83 4 day = 3.2	
#	T	D	T	D	T	D
Spring SW of bog	52	8	18	1,740	1,680	9	ND
Seep in middle of bog	53	20	20	2,400	2,960	25	ND
Seep on east of bog	55	11	8	700	590	7	ND
Seep that flow to pool near road	57	30	20	2,030	1,620	70	ND
Draining from large gulch on Blue Mountain	58	11	11	820	680	16	ND
Small rill from Blue Mountain	59	13	11	7,090	550	13	ND
Confluence of two rills off Blue Mountain	60	ND	ND	410	360	ND	ND

Concentration in parts per billion
T -- Total metals
D -- Dissolved metals
AWQC -- Ambient water quality criteria -- based on hardness of 100 mg per liter $CaC0_3$
ND -- Not detected



SAMPLE LOCATIONS

WHOLE FISH ANALYSIS

30 Lehigh River 85-5-SCFO-30A-Rock Bass-NJZ
30 Lehigh River 85-5-SCFO-30B-White Sucker-NJZ
31 Lehigh River 85-5-SCFO-31-White Sucker-NJZ
32 Aquashicola Creek 85-5-SCFO-32-White Sucker-NJZ
33 Buckwha Creek 85-5-SCFO-33A-American Eel-NJZ
34 Princess Run 85-5-SCFO-34-White Sucker-NJZ
35 Ross Common Creek 85-5-SCFO-35A-Brook Trout-NJZ
36 Bushkill Creek 85-5-SCFO-36-Brook Trout-NJZ
37 Hokendauqua Creek 85-5-SCFO-37A-Brown Trout-NJZ
38 Bertsch Creek 85-5-SCFO-38A-Brown Trout-NJZ

Figure 3

Alternative Evaluation

The major objectives of remedial actions to be taken at the Palmerton Zinc Superfund Site include (1) minimize direct contact with contaminated soil, (2) reduce volume of runoff, (3) reduce contamination in runoff, and (4) mitigate environmental damage.

Based on the above objectives, numerous source control and mitigation control technologies were screened to provide a limited number of technologies applicable for remedial actions at the site. Some of these technologies were removed from further consideration based on site-specific information and other comparative criteria. These other criteria include:

- Technical performance/reliability
- Constructibility
- Health and environmental impacts
- Institutional considerations

In the RI/FS report each technology was evaluated not only in terms of theoretical feasibility, but also in terms of whether the technology is applicable to the site specific conditions. The candidate technologies that were dismissed from retention are presented below with a summary of the justification for elimination. (An expanded discussion is in the RI/FS report).

Technology	Reason(s) for Elimination
- Site Fencing	High cost and does not minimize risk
- In-situ chemical precipitation	Poor performance and unreliable
- Removing substances for offsite disposal/treatment	High cost; negative environmental and public health impacts during construction; unavailability of adequate treatment/disposal services
- Capping the site	High cost and not implementable
- Diverting upland flow	Poor performance
- Collecting and treating runoff	Deferred for subsequent RI/FS

The technologies that have been retained for further analysis can be grouped into the following three alternatives:

- No-action
- Deed restrictions only
- Soil amendments and revegetation with deed restrictions

To analyze these alternatives, an evaluation was conducted that considered the new requirements of the Superfund Amendments and Reauthorization Act of 1986 (SARA)(P.L. 99-499) and the current version of the National Contingency Plan (NCP) (50 Fed. Reg. 47912, November 20, 1985). Three broad categories were used for the evaluation: effectiveness, implementability, and cost. Within these categories there are seven factors that consider the short-term and long-term effects of each alternative (see Table 2). The evaluation is presented in detail in EPA's April 1987 RI/FS report on the Blue Mountain project. The following is a summary of the evaluation:

Alternative 1. - No-Action

The NCP requires that the no-action alternative be considered. This alternative will have no environmental or public health benefits. It will not be protective in the short-term or the long-term. The metals on the mountain will not degrade and will remain mobile and toxic for decades and probably centuries. The environmental and public health problems will continue into the foreseeable future.

Taking no action would not comply with the requirements of the Clean Water Act regarding Best Management Practices (BMP). As discussed in a 1979 EPA report by the National Enforcement Investigation Center (NEIC), steps should be taken to minimize erosion and runoff from the mountain in order to comply with the BMP requirements of the Clean Water Act.

The factors in these categories do not require an implementability and cost analysis since there are no implementation issues or costs associated with taking no action.

Alternative 2. - Deed Restrictions Only

This alternative would consist of placing restrictions in the deeds of the property for the defoliated portions of Blue Mountain. The restrictions would prohibit the use of the property for residential development, agricultural use and other activities that would result in the direct use of the property.

The effectiveness of this action would be limited to ensuring that exposure to risks posed by the site does not increase. Currently, the side of the mountain which has been defoliated is not used (although the Appalachian Trail runs along the top of Blue Mountain), and the deed restrictions would only ensure that this nonuse continues. The environmental and public health problems would continue and would not be mitigated by deed restrictions. The deed restrictions would not, of course, reduce the toxicity or mobility of the hazardous substances on the mountain. As discussed under the no-action alternative, this action would not meet the BMP goals of the Clean Water Act.

This action would be an administrative action only; therefore, concerns related to technical feasibility and availability are not relevant. The primary administrative issue is the uncertainty of the Federal Government's ability to require deed restrictions. An action such as this would have

Table 2

EVALUATION FACTORS FOR ALTERNATIVE EVALUATION

	EFFECTIVENESS		IMPLEMENTABILITY			COST	
	Protectiveness	*Reduction of Toxicity, Mobility, or Volume*	*Technical Feasibility*	*Administrative Feasibility*	*Availability*	*Remedy*	*Replacement*
SHORT-TERM	Reduction of existing risks Compliance with ARARs Compliance with other criteria, advisories, and guidances Protection of community during remedial actions Time until protection is achieved		Ability to construct technology Short-term reliability of technology	Ability to obtain approvals from other agencies Likelihood of favorable community response Coordination with other agencies Development of future coordination network Compliance with some location-specific ARARs	Availability of treatment, storage, and disposal services and capacity Availability of necessary equipment and specialists	Development and construction costs Operating costs for implementing remedial action Other capital and short-term costs until remedial action is complete	
LONG-TERM	Reduction of future risks Long-term reliability Compliance with ARARs Prevention of future exposure to residuals Potential need for replacement	Permanent and significant reduction of toxicity, mobility or volume Use of permanent solutions and treatment technologies or resource recovery technologies	Ease of undertaking additional remedial action, if necessary Ability to monitor effectiveness of remedy Ability to perform operation and maintenance functions			Costs of operation and maintenance for as long as necessary Costs of 5-year reviews	Potential for remedial action or replacement costs if remedy were to fail

very little precedent under Superfund as a stand-alone action. The effective implementation of the action would, therefore, most likely depend on the landowners voluntary placement of restrictions in the deed.

The costs of this action are minimal if done voluntarily by the current landowners and would only involve the small legal fees of modifying the deed.

Alternative 3. - Soil Amendments and Revegetation with Deed Restrictions

This alternative would consist of using a mixture of sewage sludge and fly ash to revegetate the defoliated portions of Blue Mountain.

A greenhouse study was conducted from December 1985 to June 1986 as a preliminary step in determining if the application of a sewage sludge-fly ash mixture to Blue Mountain would be an effective technology for revegetating the defoliated areas. The study was designed to evaluate the proposed sludge-fly ash mixture ratios and to screen vegetation species. Ten tree species and twelve herbaceous species were planted and grown under controlled conditions.

Overall, results of the 98-day study were successful with all tree species and eleven of the twelve herbaceous species germinating and continuing to grow. Based on the successful outcome of the greenhouse study, EPA determined that large-scale field test plots on Blue Mountain were appropriate.

Ten 1-acre plots were installed by the City of Allentown from May to June of 1986. The plots were located in sets of three for the application of various sludge-fly ash ratios (ie. 1S:1FA, 2S:1FA, 3S:1FA). Agricultural limestone and potash were applied on each plot at specified application rates. The plots were then hydroseeded and mulched and tree seedlings were later planted.

Germination and emergence of herbaceous species occurred within 10 days following hydroseeding/mulching. Root development and root reserves were all normal and well developed. The survival rate of planted tree seedlings depended on species with some influence on sludge-fly ash ratios. Generally, all hardwood species had a survival rate of over 73 percent over all sludge-fly ash ratios, except red maple which had a rate of 23 percent.

Based on the results of one growing season, it appears that this remedial alternative is feasible to continue the revegetation of Blue Mountain.

Although the exact design and procedures for the full-scale program will be based on further analysis of the field plots and on the best judgement of experts in the field of revegetation as the revegetation program is implemented, it appears that the general outline that was followed during the field plot trails will be implemented on a larger scale.

It would take over 10 years to revegetate the mountain using Allentown and Palmerton sludge alone unless Philadelphia sludge or other sources are made available. There is also the possibly that Allentown sludge will not be available in 3 to 5 years if a municipal waste incinerator is built in the Allentown area because the City of Allentown would dispose of its sludge in the incinerator. These uncertainties and time delays indicate that a large and reliable source of sludge should be considered to augment the sludge from the Palmerton and Allentown areas.

This alternative will be effective by being protective in both the long-term and short-term and will reduce the mobility of the hazardous substances on the mountain, thereby, meeting all four of the remedial action objectives.

EPA's National Enforcement Investigation Center (NEIC) conducted a study of the Palmerton site in 1979 (NEIC,1979). This study evaluated the runoff and surface water discharge from the site and recommended a series of measures to ensure compliance with the Clean Water Act. Relevant to the Blue Mountain area, the NEIC recommended revegetation of the mountain to meet the Clean Water Act requirements of BMP to reduce surface water discharges.

Guidelines regarding the land application of sewage sludge have been developed by the State of Pennsylvania. The Pennsylvania Department of Environmental Resources (DER) has in effect regulatory guidance titled "Interim Guidelines for Sewage Use For Land Reclamation, 1977."

These guidelines have maximum loading rates for metals. These rates are:

Element	Maximun Lbs./Acre
Cadmium	3.0
Copper	100.0
Chromium	100.0
Lead	100.0
Mercury	0.3
Nickel	20.0
Zinc	200.0

These loading rates will not be exceeded. If necessary, Palmerton sludge will be mixed with the other sludges to ensure that the loading rates for cadmium and zinc are not exceeded.

The guidelines also have a maximum dry sludge application rate of 60 tons per acre. The anticipated rate for this project is 20 to 25 tons per acre and the 60 tons per acre will not be exceeded.

The guidelines also require soil pH be adjusted to 6.0 in the first year, up to 6.5 pH by the second year and maintained at 6.5 for 2 years after application. With joint applications of limestone and fly ash these levels should be attainable. A protective erosion and sedimentation control plan will be developed and implemented.

It is technically impractical to meet some of the guidelines because of the terrain on Blue Mountain. Specifically, the rocky terrain prevents incorporation of the sludge into the soil as preferred by the guidelines; the slopes of the mountain are in excess of the 20 percent maximum recommended by the guidelines; and, there are bedrock outcrops on the mountain that the guidelines recommend be avoided. To overcome these problems, the project can be implemented to minimize any erosion caused by the steep slopes and the inability to incorporate the sludge. Overland movement of sludge was nonexistent during the field test. Application of the sludge on outcrops should cause no negative impacts and may improve water quality by reducing the amount of contaminated runoff entering the bedrock.

Operation and maintenance will not be necessary because the goal is to establish a natural eastern forest ecosystem. Consistent with Section 121 of the Superfund Amendments and Reauthorization Act of 1986 (SARA) (P.L. 99-499), the site would be revisted every five years to ensure continued effectiveness of the selected alternative.

The cost to implement the alternative would be minimal. The municipalities that may apply the sewage sludge and other amendments should do so at no cost to EPA, provided the cost of implementing the alternative is less than it costs the municipalities to dispose of the sludge.

Comparative Analysis

No environmental or public health benefits would result from implementing Alternatives 1 or 2. The reduction of existing or future health risks by preventing continued exposure to metals would not be addressed. Unlike Alternative 3, the metals would remain mobile and will continue to contaminate area surface waters by not minimizing runoff and erosion. This would not comply with the requirements of the Clean Water Act regarding Best Management Practices (BMP).

Addressing implementability, Alternative 1 does not require an implementability analysis since there is no implementation issues associated with taking no action. The effective implementation of Alternative 2 would depend on the property owners voluntary placement of restrictions in the deed. Based on the results of field test plots, Alternative 3 is implementable, provided their are reliable sources of sewage sludge to complete the revegetation of the defoliated areas.

There are no costs for Alternative 1 since this involves no action. The costs for Alternative 2 are minimal which should involve only small legal fees for the modification of deeds. Likewise, costs for implementing Alternative 3 would also be minimal, if the cost of applying the sewage sludge for municipalities is a cost effective means of disposal in lieu of their current practices.

Recommended Alternative

Section 121 of SARA and the current version of the National Contingency Plan (NCP)(50 Fed. Reg. 47912, November 20,1985) establish a variety of requirements relating to the selection of remedial actions under CERCLA. Applying the current evaluation criteria in Table 2 to the three remaining remedial alternatives, we recommend that Alternative 3 be implemented at at the Palmerton Zinc Superfund Site.

This is an interim remedy for the site. When the RI/FS's for the other operable units are completed by the responsible parties, ROD's will be issued to address all aspects of the site. This interim remedy will not, however, be inconsistent with a final comprehensive remedy for the site. This interim remedy does not attempt to ensure compliance with all ARARS for the entire site, but as discussed above under Alternative 3, will be consistant, to the extent practicable, with those action specific ARARS addressing sludge application, the Clean Water Act and Best Management Practice requirements.

This alternative consists of using a mixture of sewage sludge and fly ash to revegetate the defoliated areas of Blue Mountain. Based on greenhouse studies and results of field test plots it appears that this technology is feasible.

Although changes may be made to application rates and/or sludge-fly ash ratios, it appears that a general outline of the procedures for the revegetation program would be as follows:

Step 1: Site preparation -- Heavy equipment (i.e., bulldozers) would be used to install access roads in the areas targeted for revegetation.

A concrete pad with reasonable berms would be installed to mix the sludge and fly ash on-site.

Step 2: Lime potash application -- Lime and potash would be sprayed on the areas targeted for revegetation. Lime would be applied at approximately 10 tons per acre and potash at 80 pounds actual K per acre.

Step 3: Sludge-fly ash application -- The sludge-fly ash mixture would be applied by spraying the mixture onto the target area. The sludge-fly ash ratio will be based on further analysis of the field test plots. The sludge will be obtained from the Town of Palmerton, Allentown, and, if necessary, Philadelphia.

Step 4: Plant target area -- Grasses would be planted by blowing a mixture of grass seed onto the target area. Studies are continuing on the feasibility of also blowing tree seed onto the area. It is not yet clear if tree seed will germinate on the site. If tree seed will not germinate, seedlings will be planted.

Step 5: Apply mulch -- To protect the seed and permit germination, adequate mulch will have to be applied. Mulching may be reduced or eliminated if spring oats are planted in the fall. This will provide winter cover that will die by spring. The target areas can then be seeded with the permanent plant species in the spring, and the spring oat stubble will serve as a protective "mulch" layer for the permanent species seed.

Schedule

The anticipated schedule is to continue with some limited design studies in the Fall of 1987. Beginning as soon as possible, but probably not before the end of 1987, large scale, multi-acre revegetation will begin. It will take a number of years to complete the remedial action, the exact time depending on the amount of sludge available. EPA's goal is to complete the project in five years.

Responsiveness Summary

This responsiveness summary is divided into the following sections:

Section I Overview. A discussion of EPA's preferred remedial alternative.

Section II Background of Community Involvement and Concerns. A discussion of the community interest and concerns raised during remedial planning activities at the Palmerton Zinc Superfund Site.

Section III Summary of Major Comments Received During the Public Comment Period and Agency Responses. A summary of comments and responses received by the general public and potentially responsible parties.

I. Overview

The proposed remedial action is to revegetate the defoliated areas of Blue Mountain using a mixture of sewage sludge and fly ash. An RI/FS report discussing the environmental and public health problems associated with the defoliated portions of Blue Mountain was prepared by EPA. The report also examined potential methods to address these problems. Based on the information in the report, the revegetation program is recommended.

The RI/FS report and a description of the recommended alternative was released for public review and comment on May 22, 1987, a public meeting was held on June 18, 1987 and the comment period closed on July 6, 1987. A total of five written comments were received.

II. Background of Community Interest and Concerns

The community has generally been concerned about the environmental devastation and the negative image the barren mountaian projects. The action being considered at this time deals only with the mountain, however, there are two other major contamination problems which have been of public concern. Widespread soil contamination exists because of the deposition of heavy metals from past air emissions from the smelter. There is also significant ground water and surface water contamination on and near the smelter property.

The public has been concerned about the potential health effects of the soil and groundwater contamination and also about the potential financial impact on the zinc company of any remedial action. The current owners of the smelter, Horsehead Industries, are completing and RI/FS on the ground water and surface water problems on and near the smelter property. An RI/FS on the widespread soil contamination is being completed by the previous owners of the smelter, Gulf & Western Inc. These RI/FS's are being done under a consent order with EPA and the reports will be available for public review and comment in the coming months.

III. Summary of Major Comments Received During the Public Comment Period

Public Comments

Comment: The real reason for this project is not for the revegetation of Blue Mountain, but a means for the City of Philadelphia to dispose of its sewage sludge.

Reply: This is not a sludge disposal program. Sewage sludge will be used as a soil conditioner in order to provide the necessary nutrients to sustain initial plant growth in the defoliated areas on Blue Mountain.

Comment: Questions were raised on the dangers and public health effects of the continued operation of the New Jersy Zinc smelter.

Reply: The Superfund program does not regulate the daily operations of such facilities. Air and water discharges into the environment are regulated under the Clean Air Act and the Clean Water Act, respectively. Specific complaints will be directed to the Pennsylvania DER or EPA program offices administering programs in these areas.

Comment: Questions concerning the area wide contamination of surface soils and the consumption of vegetables grown in private gardens were raised.

Reply: These issues are currently being studied in a separate RI/FS being prepared by Gulf & Western Industries, under an EPA enforcement order. The RI/FS report will be ready by the end of 1987 or early 1988.

Comment: What will happen to the sludge-fly ash mixture in the event of a heavy rainfall.

Reply: Based on the performance of test field plots on Blue Mountain, there is no evidence of overland movement of sludge or erosion problems due to rainfall.

Comment: Public notification for the EPA meeting held at the Aquashicola Fire House was inadequate.

Reply: Public notification was done in accordance with the legal requirements of the Superfund Amendents and Reauthorization Act. The public comment period on the preferred alternative and the RI/FS report was initiated on May 22, 1987, a public meeting was held on June 18, 1987, and the comment period remained open until July 6, 1987. Additionally, a number of articles appeared in local newspapers discussing the report and preferred alternative, and EPA placed an ad in the Lehighton Times on June 15, 1987.

Comment: Questions of residents concerns regarding the quality of drinking water in the area.

Reply: The quality of area drinking water meets the standards of the Safe Drinking Water Act. In addition, an ongoing study is being performed by Horsehead Industries, Inc., under an EPA enforcement order. The RI/FS report will be ready by the end of 1987 or early 1988.

Comments from Potentially Responsible Parties

On behalf of the New Jersy Zinc Company, the firm of Squire, Sanders & Dempsey submitted the following comments which addressed the proposed remedial action for Blue Mountain in their letter of June 29, 1987.

Comment: Thirty days is an insufficient time for New Jersey Zinc to retain technical experts to review the report.

Reply: The report addressing the Palmerton Zinc Superfund Site (April 1987) was released on May 22, 1987. The comment period was opened until July 5, 1987. In addition, EPA has always kept an open channel of communication with New Jersey Zinc.

Comment: Where has this technique been used previously on steep slopes near populated areas besides remote mining areas.

Reply: The selected remedial alternative is an innovative technology which has proven to be a feasible remedy for Blue Mountain. After one growing season, the field test plots have performed satisfactorily and has shown no overland movement of sludge which was applied to sloped areas.

Comment: The historical air emissions provided in chapter three of the April 1987 report are estimates only and may be substantially an error.

Reply: Since there is no known historical stack emission data for the New Jersey Zinc smelter, estimates were made as stated on page 3-8 of the April 1987 report. These estimates were provided to EPA by the New Jersey Zinc Company.

Comment: U.S. EPA water quality criteria do not apply to incidental runoff from Blue Mountain.

Reply: EPA water quality criteria are a good basis for assessing the quality of the runoff since it directly impacts area surface waters.

Comment: Fish contamination -- no documentation in report to indicate that these levels are high.

Reply: At the request of EPA, the Agency for Toxic Substances and Disease Registry (ATSDR) evaluated the health significance of metal concentrations in fish taken from streams in the area. ATSDR stated that levels of lead and cadmium in the fish were found to pose a potentially significant health threat if consumed. The U.S. Fish and Wildlife Service has also found that these levels are among the highest ever found in Pennsylvania.

Comment: Metal contamination of fish can be mitigated by a health advisory to fishermen.

Reply: A health advisory would not resolve the problem of metal contamination in area fish. An advisory would only side step the main concern which is the elimination of future fish contamination due to metals.

Comment: The lack of vegetation on Blue Mountain is not a condition requiring remediation under Superfund and furthermore, the statutory prerequisites for remedial action have not been met.

Reply: The lack of vegetation on Blue Mountain requires remediation under Superfund because the present condition of Blue Mountain allows the release of hazardous substances into the environment. The statutory prerequisites for remedial action have been met because of this condition.

Comment: Expenditure of large amounts of public money to rectify what is apparently a minor problem is inconsistent with Superfund and the National Contingency Plan.

Reply: Contamination of some 2,000 acres of land with heavy metals which are being released into the environment can not be characterized as a minor problem and remediation of such a condition is consistent with Superfund and the National Contingency Plan.

Comment: New Jersey Zinc does not at this time agree to any restrictions being placed on the use of its property for any purpose and questions the legality of such restrictions under Superfund, the U.S. Constitution or other applicable law.

Reply: While Superfund and State law may not provide a definitive means by which use of the property can be restricted, Superfund does provide for injunctive relief should the property be used in a manner which permits an actual or threatened release of a hazardous substance.

Comment: Letter dated July 16, 1987 commenting upon government's approach to the site incorporated by reference.

Reply: Comments in the letter were primarily directed at the problems associated with the cinder bank. It would therefore be inappropriate to respond to those comments at this time.

Palmerton Zinc Site

Enforcement Status

Historical zinc smelting operations created widespread heavy metal contamination both on and off the Palmerton Zinc plant property. The contaminated areas have been divided into three district areas by EPA and are referred to as the Blue Mountain Project, the Cinder Bank and Off-Site Contamination. An RI/FS for both the Cinder Bank and Off-Site Contamination are currently being performed under a Consent Order by the responsible parties (RPs) associated with this site. The RPs had declined participation in the Blue Mountain RI/FS which was completed by EPA in April, 1987.

In a letter dated June 10, 1987, EPA gave the RPs notice of their potential liability with regard to the implementation of the Blue Mountain Project remedial action. Enclosed with this letter was a copy of the completed RI/FS and a copy of EPA's proposed remedial alternative. The RPs were extended the opportunity to present a good faith proposal to conduct the Remedial Design and Remedial Action to the Agency within sixty (60) days of receipt of the June 10, 1987 notice letter. EPA expects a proposal from at least one RP by the week of August 9, 1987.

Prepared by: Patricia Tan
Hazardous Waste Enforcement Branch

PALMERTON ZINC PILE (BLUE MOUNTAIN)
SARA ADMINISTRATIVE RECORD *
INDEX OF DOCUMENTS

Site Identification

1) Report: Field Investigations of Uncontrolled Hazardous Sites Report on Palmerton Zinc Company, Palmerton, Pennsylvania, dated 2/19/81.

2) Report: A Preliminary Assessment of New Jersey Zinc at Palmerton, PA, dated 2/7/80.

3) Potential Hazardous Waste Site Identification form, dated 5/28/80.

4) Report: Evaluation of Runoff and Discharges from New Jersey Zinc Company, dated 12/79.

Remedial Enforcement Planning

1) U.S. EPA Administrative Order By Consent, dated 9/85.

2) Letter to Mr. Martin Davis from Mr. Stephen Wassersug regarding public funds, dated 8/1/84.

3) Letter to Mr. William E. Flaherty from Mr. S. Wassersug regarding public funds, dated 8/1/79.

Remedial Response Planning

1) Report: Palmerton Zinc Superfund Site Blue Mountain Project, dated 4/87.

2) Memorandum to regional administrators from Mr. J. Winston Porter regarding eleventh remedy delegation, dated 3/26/87.

3) Memorandum to Mr. J. Winston Porter from Mr. James Seif regarding delegation of remedy selection, dated 2/10/87.

4) Report: Evaluation of Sludge - Flyash Mixtures as Potential Amendments to Facilitate Revegetation of Blue Mountain; A Literature Review, by Mr. John Oyler (undated).

5) Report: Evaluation of the First Year Effects of the Sludge-Flyash Amendments of Surface Soil Chemical Properties and Vegetation Growth Responses, by William E. Sopper, dated 12/86.

6) Report: Installation of Field Plots on Palmerton Blue Mountain to Evaluate the Use of Sludge-Flyash mixtures as an Amendment to Facilitate Vegetation Establishment, by William E. Sopper, dated 8/86.

7) Interagency Agreement between U.S. EPA and the U.S. Department of Agriculture Soil Conservation Service, dated 8/1/86.

* Administrative Record available 7/31/87.

8) Commitment Notice for Region III oversight, dated 6/19/86.

9) Report: Evaluation of Sludge-Flyash Mixtures as Potential Amendments to Facilitate Revegetation of Palmerton Blue Mountain, by William E. Sopper, dated 7/86.

10) Report: A Preliminary Survey of Contaminants in Fish in the Vicinity of Two Zinc Smelters at Palmerton, Carbon County, Pennsylvania, by David J. Putnam and Cynthia L. Rice, dated 8/86.

11) Letter to Mr. Ed Shoener from Mr. Joseph McMahon regarding Allentown/ Palmerton sludge for Cinder Bank revegetation, dated 6/13/86.

12) Letter to Mr. Joseph McMahon from Mr. Ed Shoener regarding temporary storage of wastewater residuals, dated 5/8/86.

13) Letter to Mr. Ed Shoener from Mr. Joseph McMahon regarding temporary storage of wastewater residuals, dated 5/5/86.

14) Letter to Mr. Ed Shoener from Mr. James Olson regarding budget for Phase III, dated 5/5/86. Budget is attached to letter.

15) Letter to Mr. Ed Shoener from Mr. Joseph McMahon regarding experimental land reclamation requirements for the Blue Mountain at New Jersey Zinc, dated 5/2/86. Attachments to letter are listed in paragraph 2 of the letter.

16) Report: Palmerton Zinc Site National Priorities List Site Atmospheric Deposition Analysis of Cadmium, Zinc, Lead, and Copper in the Vicinity of the New Jersey Zinc Palmerton Facility, by Alan J. Cimorelli, dated 5/86.

17) Letter to Mr. Bob Heidecker from Mr. Ed Shoener regarding Pennsylvania DER permit, dated 4/16/86.

18) Letter to PSC Environmental Services Incorporated, from Mr. Joseph McMahon regarding New Jersey Zinc land reclamation, dated 3/21/86.

19) Letter to Allentown Wastewater Treatment Plant from Mr. Russell Smith regarding Borough of Palmerton sludge disposal permit, dated 2/19/86. ASW Environmental Consultants Inc. laboratory results are attached to letter.

20) Interagency Agreement between U.S. EPA and U.S. Department of Agriculture Soil Conservation Service, dated 2/11/86.

21) Interagency Agreement between U.S. EPA and U.S. Department of Agriculture Soil Conservation Service, dated 2/11/86.

22) Report: Application for an Experimental Permit to Evaluate the Use of Sludge/Flyash Mixtures to Facilitate Revegetation of Blue Mountain at Palmerton, PA, by William E. Sopper, dated 1/86.

23) Letter to Mr. Ed Shoener from Mr. Robert Heidecker regarding Phase I Feasibility Study, dated 1/2/86. Proposed Greenhouse Study and proposed budget are attached to letter.

24) Letter to Mr. Gene Lucero from Mr. Bruce Blanchard regarding preliminary natural resources survey, dated 12/20/85.

25) Report: Feasibility Study for the Revegetation of Blue Mountain at the New Jersey Zinc Company Plant at Palmerton, Pennsylvania, by William E. Sopper, dated 12/85.

26) Letter to Mr. Ed Shoener from Mr. John Oyler regarding progress reports for six specific tasks, dated 10/4/85. AERO-SPREAD advertisement and photographs are attached to letter.

27) Interagency Agreement between U. S. EPA and U. S. Department of Agriculture Soil Conservation Service, dated 8/1/85.

28) Letter to Mr. Ed Shoener from Mr. John Oyler regarding literature review, dated 8/27/85. Literature review is attached to letter.

29) Interagency Agreement between U. S. EPA and U. S. Department of Agriculture Soil Conservation Service, dated 7/1/85.

30) Letter to Ms. Linda Paul from Mr. Edward Shoener regarding Palmerton Zinc project, dated 1/29/85.

31) Work Plan for Remedial Investigation/Feasibility Study of alternatives, dated 8/84.

Community Involvement

1) Letter to Mr. Ed Shoener from Mr. Larry Latzgo regarding meeting at Aquashicola Fire Hall, dated 7/5/87.

2) Letter to Mr. Ed Shoener from Mr. James F. Allen regarding proposed remedial action, dated 6/29/87.

3) Letter to Ms. N. L. Sinclair from Mr. Allen Green regarding meeting at Aquashicola Fire Hall, dated 6/28/87.

4) Letter to Ms. Nanci Sinclair from Mr. P. Latzgo and Mr. Larry Latzgo regarding meeting at Aquashicola Fire Hall, dated 6/28/87.

5) Letter to Ms. Nanci L. Sinclair from Mr. Steve Borbe regarding meeting at Aquashicola Fire Hall, dated 6/22/87.

6) Public Notice regarding public meeting at Palmerton, dated 6/18/87.

7) Press release from Mr. Bruce Conrad, Carbon County Office of Planning and Development, regarding Remedial Investigation/Feasibility Study of Palmerton Zinc Site, dated 5/22/87.

8) Press release from U. S. EPA regarding Remedial Investigation/Feasibility Study (RI/FS) of Palmerton Zinc Site, dated 5/21/87.

9) Press release from U. S. EPA regarding Consent Order with New Jersey Zinc and Gulf and Western, dated 10/11/85.

10) Letter to Senator Arlen Specter from Mr. Stanley Laskowski regarding letter sent to County Commissioners, dated 2/15/85.

11) Letter to Senator Arlen Specter from Mr. Thomas Eichler regarding the expression of thanks for letters from the public, dated 1/23/85.

12) Letter to Congressional liason, U. S. EPA from Senator Arlen Specter regarding public inquiries and communications, dated 12/14/84.

13) Letter to Mr. T. Eichler from Mr. John Brown regarding Palmerton Remedial Investigation/Feasiblity Study dated 11/13/84.

14) Letter to Mr. Thomas Eichler from Mr. Stanley Cope, M. D., regarding new information on site, dated 11/7/84.

15) Letter to Mr. Thomas P. Eichler from Ms. Barbara Spadt regarding a proposed study, dated 11/8/84.

16) Letter to Messrs. Koch, Wildoner and Delong from Mr. Thomas Eichler regarding the Palmerton Remedial Investigation/Feasibility Study, dated 11/8/84.

17) Letter to Mr. Keith McCall from Mr. Thomas Eichler regarding the Palmerton Remedial Investigation/Feasibility Study, dated 12/4/84.

18) Letter to Mr. Gus Yatron from Mr. Thomas Eichler regarding letter from Commissioner Albert Koch, dated 11/29/84.

19) Letter to Mr. Thomas Eichler from Mr. Rodney Borger regarding support of New Jersey Zinc Company, dated 11/27/84.

20) Letter to Mr. Howard Grossman from Mr. Thomas Eichler regarding response to his letter of concern, dated 11/20/84.

21) Letter to Mr. Thomas Eichler from Mr. Jeffrey Zachon regarding support of New Jersey Zinc Company, dated 11/20/84.

22) Letter to Mr. Thomas Eichler from Mr. Ronald Mihalho regarding support of New Jersey Zinc Company, dated 11/16/84.

23) Letter to Mr. Thomas Eichler from Mr. Gerald Noll regarding support of New Jersey Zinc Company, dated 11/9/84.

24) Letter to Ms. Judith A. Dorsey from Mr. W. R. Bechdolt regarding draft work plan, dated 11/13/84.

25) Letter to Mr. Thomas Eichler from Mr. Keith McCall regarding support of New Jersey Zinc Company, dated 11/8/84.

26) Letter to Mr. Thomas Eichler from Mr. Robert Miller regarding support of New Jersey Zinc Company, dated 11/7/84.

27) Letter to Mr. Thomas Eichler from Mr. J. N. Ord regarding work plan, dated 11/6/84.

28) Letter to Mr. Thomas Eichler from Mr. James North regarding support of New Jersey Zinc Company, dated 11/5/84.

29) Letter to U. S. EPA from Mr. Albert Serpes regarding support of New Jersey Zinc Company, dated 10/29/84.

30) Letter to Mr. Stephen Wassersug from Mr. Steve Borbe regarding support of unbiased study, dated 10/24/84.

31) Letter to Mr. Thomas Eichler from Ms. Janet Snyder regarding support of EPA actions at site, dated 10/24/84.

32) Letter to Senator Arlen Specter from Mr. Frederick Schanstine regarding use of public funds, dated 10/22/84.

33) Letter to Mr. Joe Donovan from Mr. M. Luther Fuller regarding concern for site actions, dated 10/26/84.

34) Letter to Senator Arlen Specter from Mr. Albert Koch regarding the RI/FS, dated 10/9/84.

35) Letter to Mr. John Heinz from Mr. Albert Koch regarding the RI/FS, dated 10/19/84.

36) Letter to Mr. Thomas Eichler from Mr. Frederich Schanstine regarding EPA actions at the site, dated 10/19/84.

37) Letter to Mr. Thomas Eichler from Mr. Bill Bechdolt regarding the RI/FS, dated 10/15/84.

38) Letter to Mr. Joe Donovan from Mr. M. Luther Fuller regarding EPA meeting, dated 10/15/84.

39) Letter to Mr. Thomas Eichler from Mr. Lester Grady regarding use of public funds, dated 10/15/84.

40) Letter to Mr. Thomas Eichler from Mr. Joe Ebeley regarding support of New Jersey Zinc Company, dated 10/13/84.

41) Letter to Mr. Thomas Eichler from Mr. Clifford Jones regarding support of New Jersey Zinc Company, dated 10/10/84.

42) Letter to Mr. Thomas Eichler from Mr. Koch, Mr. Wildoner, and Mr. Delong regarding EPA actions at the site, dated 10/9/84.

43) Letter to Mr. William Bechdolt from Mr. John Kasten regarding burden on local economy, dated 10/9/84.

44) Letter to Mr. Thomas Eichler from Mr. James Rhoades regarding additional testing at New Jersey Zinc plant, dated 10/9/84.

45) Letter to Mr. Steve Borbe from Ms. Mary Anne Daly regarding analysis of water sample at Borbe's house, dated 10/3/84. Laboratory analysis report is attached to letter.

46) Press release from U. S. EPA regarding public meeting on Palmerton work plan, dated 10/2/84.

47) Fact sheet on Palmerton Zinc Site, dated 10/84.

48) Letter to Mr. Stephen Wassersug from Mr. Steve Borbe regarding soil and groundwater testing results, dated 9/12/84.

49) Letter to Mr. Stephen Wassersug from Mr. Steve Borbe regarding water, soil, and air testing of Palmerton area, dated 6/13/84.

50) Letter to Mr. Steve Borbe from Mr. Stephen R. Wassersug regarding work plans from water, soil, and vegetation studies at Palmerton, dated 5/31/84.

51) Letter to Mr. Stephen Wassersug from Mr. Steve Borbe regarding a request for testing at Palmerton, dated 5/14/84.

52) Letter to Mr. Stephen Wassersug from Mr. Steve Borbe regarding alleged pollution caused by New Jersey Zinc Company, dated 3/27/84.

SITE SPECIFIC GUIDANCE DOCUMENTS

1) "Heavy Metals in Cottontail Rabbits on Mined Lands Treated with Sewage Sludge,' Sludge," by R. L. Dressler, et al, dated 7/86.

2) "Contamination of the O2 Soil Horizon by Zinc Smelting and its Effect on Woodlouse Survival," by W. N. Beyer, et al, dated 1984.

3) "Heavy Metals in White - Tailed Deer Living Near a Zinc Smelter in Pennsylvania," by L. Sileo and W. N. Beyer, dated 5/30/84.

4) "Use and Disposal of Municipal Wastewater Sludge," by the U. S. EPA, dated 9/84.

5) "Lung Cancer in Relation to Environmental Pollutants Emitted from Industrial Sources," by Linda Morris Brown, et al, dated 1984.

6) "Environmental Zinc and Cadmium Pollution Associated with Generalized Osteochondrosis, Osteoporosis, and Nephrocalcinosis in Horses," by Diane E. Gunson, et al, dated 1982.

7) "The Impact of Zinc Smelter Emissions on Forest Litter Anthropods," by Carl L. Strojan, dated 1978.

8) "Forest Leaf Litter Decomposition in the Vicinity of a Zinc Smelter," by Carl L. Strojan, dated 1978.

9) "A Nationwide Survey of Heavy Metal Absorption in Children Living Near Primary Copper, Lead and Zinc Smelters," by Edward L. Baker, et al, dated 1977.

10) "Effects of Zinc Smelter Emissions and Fire on a Chestnut - Oak Woodland," by Marilyn J. Jordan, dated 1975.

11) "Effects of Zinc - Smelter Emissions on Forest Soil Microfluora," by Marilyn J. Jordan, et al, dated 7/28/75.

12) "Influence of Effluents from a Zinc Factory on Lichens," by Thomas H. Nash III, dated 1975.

13) "Contamination of Soil and Vegetation Near a Zinc Smelter by Zinc, Cadmium, Copper, and Lead," by Marilyn J. Buchauer, dated 1973.

14) "Interim Guidelines for Sewage Sludge Use for Land Reclamation," by Pennsylvania Department of Environmental Resources (undated).

15) "Heavy Metal Exposure in Populations Living around Zinc and Copper Smelters," by Tyler D. Hartwell, et al (undated).

GENERAL GUIDANCE DOCUMENTS *

1) "Promulgation of Sites from Updates 1-4," Federal Register, dated 6/10/86.

2) "Proposal of update 4," Federal Register, dated 9/18/85.

3) Memorandum to U. S. EPA from Mr. Gene Lucero regarding community relations at Superfund Enforcement sites, dated 8/28/85.

4) Groundwater Contamination and Protection, updated by Mr. Donald V. Feliciano on 8/28/85.

5) Guidance on Remedial Investigations under CERCLA, dated 6/85.

6) Guidance on Feasibility Studies under CERCLA, dated 6/85.

7) "Proposal of Update 3," Federal Register, dated 4/10/85.

8) Memorandum to U. S. EPA from Mr. Jack McGraw entitled "Community Relations Activities at Superfund Sites - Interim Guidance," dated 3/22/85.

9) "Proposal of Update 2," Federal Register, dated 10/15/84.

10) EPA Groundwater Protection Strategy, dated 9/84.

11) Memorandum to U. S. EPA from Mr. William N. Heckman, Jr. entitled "Transmittal at Superfund Removal Procedures - Revision 2," dated 8/20/84.

12) "Proposal of Update 1," Federal Register, dated 9/8/83.

13) Community Relations in Superfund: A Handbook (interim version), dated 9/83.

14) "Proposal of first National Priority List," Federal Register, dated 12/30/82.

15) "Interim Priorities List," Federal Register, dated 10/23/81.

16) "Expanded Eligibility List," Federal Register, dated 7/23/82.

17) Uncontrolled Hazardous Waste Site Ranking System: A User's Manual (undated).

18) Field Standard Operating Procedures- Air Surveillance (undated).

19) Field Standard Operating Procedures- Site Safety Plan (undated).

*Located in U. S. EPA Region III office.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Post Office Box 2063
Harrisburg, Pennsylvania 17120

August 20, 1987

Deputy Secretary for
Environmental Protection

Stephen R. Wassersug, Director
Hazardous Waste Management Division
U.S. Environmental Protection Agency
841 Chestnut Building
Philadelphia, PA 19107

Dear Mr. Wassersug:

We have reviewed the draft "Site Description and Summary of Remedial Alternative Selection" Report for the Blue Mountain Revegetation Project. The Department supports this project and agrees that the trial demonstration plots installed in 1986 proves the viability of spraying a sludge and fly ash mixture to provide a growth media for permanent revegetation of the mountain.

We find the report satisfactory in its present form and have no recommendations. Thank you for the opportunity to review this report.

Sincerely,

Mark M. McClellan